

REMARKS/ARGUMENTS

35 U.S.C. 112/101 rejection

The Examiner rejected claims 22-24 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. In particular, the Examiner states that the claim does not set forth any process steps involved in the method/process. The Examiner also rejected claims 22-24 under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process.

The Applicant has amended claim 22 to recite process steps involved in the ammonia absorption refrigeration process. This amendment should now overcome the 35 U.S.C. 101 and 35 U.S.C. 112 rejections. Since Examiner stated that claims 22-24 would be allowable if rewritten or amended to overcome the 35 U.S.C. 112 rejection, the Applicant respectfully requests the Examiner to allow these claims.

35 U.S.C. 102 rejection

The Examiner rejected claims 1-4, and 10-12 under 35 U.S.C. 102(b) as being anticipated by Weedman (U.S. Pat. No. 3067270). According to MPEP §2131, "to anticipate a claim, the reference must teach every element of the claim."

The Applicant respectfully submits that original claim 1 is not anticipated by the Weedman patent. The Examiner states that the Weedman patent discloses a crystallization process for recovering paraxylene from a substantially hydrocarbon feedstock comprising cooling said hydrocarbon feedstock in at least one refrigerated crystallization stage that is indirectly refrigerated by evaporating at least a portion of a substantially liquid stream comprising ammonia. The Examiner cites column 1, lines 66-72; and column 3, lines 30-34 (and the drawing) as support for such a statement.

Column 1, lines 66-72, makes no mention of indirectly refrigerating at least one crystallization stage by evaporating a portion of a liquid stream comprising ammonia. Column 3, lines 30-34 describes xylene crystals sent via a conduit 18 to a chiller 19, which is cooled with ammonia supplied by via conduit 20 and removed via conduit 21. This use of ammonia as taught by the Weedman patent is a direct refrigeration process where ammonia directly contacts the crystal feed.

By contrast, the Applicant recites at several points throughout its patent application that they teach that "indirect heat transfer means that the refrigerant is not in direct contact with the material being cooled, but rather, the refrigerant and the material being cooled are on opposite sides of a heat transfer surface" (see pages 16, 23, 26, and 28 of the specification). The Applicant also teaches that "for this present invention, the refrigerant is a substantially liquid stream comprising ammonia and the material being cooled is the substantially hydrocarbon feedstock (see pages 16, 23, 26, and 28 of the specification). There is no teaching in the Weedman patent of an indirect refrigeration process as taught by the Applicant.

For claim 2, again there is no teaching of all the claim elements of the Applicant's invention. The Examiner's statement that there are similar feedstock compositions in Applicant's invention and Weedman still does not account for the lack of teaching of indirect refrigeration by evaporating at least a portion of a substantially liquid stream comprising ammonia, as taught by the Applicant. Furthermore, because the Weedman patent does not anticipate independent claim 1, it also does not anticipate any of the pending dependent claims.

For claims 3 and 4, again there is no teaching of all the claim elements of the Applicant's invention. The Examiner's statement that there are overlapping ranges of paraxylene concentrations in Applicant's invention and Weedman still does not account for the lack of teaching of indirect refrigeration by evaporating at least a portion of a substantially liquid stream comprising ammonia, as taught by the Applicant. Furthermore, because the Weedman patent does not anticipate independent claim 1, it also does not anticipate any of the pending dependent claims.

For claims 10, 11, and 12, again there is no teaching of all the claim elements of the Applicant's invention. Specifically, there is no teaching of indirect refrigeration by evaporating at least a portion of a substantially liquid stream comprising ammonia, as taught by the Applicant. The arguments presented for claim 1 above regarding the lack of indirect refrigeration in Weedman are again applicable for the arguments against claims 10, 11, and 12. Furthermore, because the Weedman patent does not anticipate independent claim 1, it also does not anticipate any of the pending dependent claims.

For the aforementioned reasons, Weedman does not anticipate claim 1, nor does Weedman anticipate dependent claims 2-4, and 10-12. Thus, the Applicants respectfully request that the Examiner withdraw the 102(b) rejection for claim 1, as well as for dependent claims 2-4, and 10-12. Applicant submits that the subject claims are now in condition for allowance and respectfully request allowance of the above mentioned claims.

35 U.S.C. 103 rejection

The Examiner rejected claims 5, 6, and 13-18 under 35 U.S.C. 103(a) as being unpatentable over Hubbell (US Pat. No. 5811629) in view of Weedman, and claims 7, 8, and 13-18 under 35 U.S.C. 103(a) as being unpatentable over Weedman.

In order to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ 2d 1438 (Fed. Cir. 1991).

For claim 5, there is no teaching or suggestion of all the claim elements of the Applicant's invention when combining the Hubbell and Weedman references. Hubbell teaches "the use of double pipe heat exchangers with the process slurry formed inside the inner pipe and cooling provided between the pipes...cooling can be provided by boiling refrigerant or a circulating fluid which carries heat from the scraped surface heat exchangers to the refrigeration system" (see Hubbell, column 7, lines 47-53). References to heat exchangers in Figure 1 are shown as 102 (and as similar functioning roles for exchangers 202, 302, 402, 502, and 602 in Figures 2-6). In Figure 1, a purified paraxylene stream is passed through the heat exchanger 102 prior to entering the earliest crystallization stage, and at the end, purified paraxylene crystals are withdrawn and passed through the heat exchanger 102 to cool the feed (see Hubbell, column 10, lines 28-32, and lines 57-60). The refrigeration process taught by Hubbell is a direct cooling process, and incorporating the ammonia stream from Weedman, which is also a direct cooling process, does not teach nor suggest the Applicant's claimed invention. There is no teaching or suggestion in Hubbell in combination with Weedman of an indirect refrigeration process as taught by the Applicant.

For claim 6, again there is no teaching or suggestion of all the claim elements of the Applicant's invention. The overlapping range of paraxylene concentrations in Applicant's invention and Hubbell still does not account for the lack of teaching or suggestion of an indirect refrigeration system as taught by the Applicant.

For claim 7, the Examiner states that it would have been obvious to modify the process of Weedman to provide for cooling of the ethylene refrigerant via the interprocess heat exchange between the ethylene and ammonia streams (see numbered paragraph 19 of the Office Action). The Examiner cites the Singh technical publication for the general teaching that heat transfer and heat exchange between process streams is well known in the chemical engineering arts (see numbered paragraph 19 of the Office Action). Weedman still does not teach nor suggest the claim elements of the Applicant's invention. Column 3, lines 30-34 describes xylene crystals sent via a conduit 18 to a chiller 19, which

is cooled with ammonia supplied by via conduit 20 and removed via conduit 21. This use of ammonia as taught by Weedman is a direct refrigeration process where ammonia directly contacts the crystal feed. As for the Singh publication, there is no teaching or suggestion in this reference of using ammonia to cool an ethylene refrigerant. In fact, Singh does not even mention ammonia at all. Hence, there is no teaching or suggestion of the claim elements of the Applicant's invention when viewing Weedman and Singh, either alone or in combination with each other.

For claim 8, again there is no teaching or suggestion of all the claim elements of the Applicant's invention. The Examiner's statement that there are overlapping ranges of paraxylene concentrations in Applicant's invention and Weedman still does not account for the lack of teaching or suggestion of an indirect refrigeration system as taught by the Applicant.

For claim 13, the Examiner states that it would have been obvious to modify the process of Weedman to provide for cooling of the ethylene refrigerant via the interprocess heat exchange between the ethylene and ammonia streams (see numbered paragraph 19 of the Office Action). The Examiner cites the Singh technical publication for the general teaching that heat transfer and heat exchange between process streams is well known in the chemical engineering arts (see numbered paragraph 19 of the Office Action). Weedman still does not teach nor suggest the claim elements of the Applicant's invention. Column 3, lines 30-34 describes xylene crystals sent via a conduit 18 to a chiller 19, which is cooled with ammonia supplied by via conduit 20 and removed via conduit 21. This use of ammonia as taught by Weedman is a direct refrigeration process where ammonia directly contacts the crystal feed. As for the Singh publication, there is no teaching or suggestion in this reference of using ammonia to cool an ethylene refrigerant. In fact, Singh does not even mention ammonia at all. Hence, there is no teaching or suggestion of the claim elements of the Applicant's invention when viewing Weedman and Singh, either alone or in combination with each other.

For claim 14, there is no teaching or suggestion of all the claim elements of the Applicant's invention. The Examiner's statement that there are overlapping ranges of paraxylene concentrations in Applicant's invention and Weedman still does not account for the lack of teaching or suggestion of an indirect cooling system as taught by the Applicant. Furthermore, if an independent claim is not obvious under § 103(a), then any claim depending therefrom also is not obvious. *See In re Fine*, 837 F.2d at 1076 ("Dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious." (citations omitted)); *see also* MPEP § 2143.03.

For claims 15, 16, and 17, again there is no teaching or suggestion of all the claim elements of the Applicant's invention. The Examiner's statement that there are overlapping ranges of paraxylene concentrations in Applicant's invention and Weedman still does not account for the lack of teaching or suggestion of an indirect cooling system as taught by the Applicant. For claim 18, again there is no teaching or suggestion of all the claim elements of the Applicant's invention. The Examiner's statement that there are similar slurry and melt steps still does not account for the lack of teaching or suggestion of an indirect cooling system as taught by the Applicant. Furthermore, if an independent claim is not obvious under § 103(a), then any claim depending therefrom also is not obvious. *See In re Fine*, 837 F.2d at 1076 ("Dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious." (citations omitted)); *see also* MPEP § 2143.03.

Thus, the Applicants respectfully request that the Examiner withdraw the 103(a) rejection for claims 5, 6, 7, 8, and 13-18. Applicant submits that the subject claims are now in condition for allowance and respectfully request allowance of the above mentioned claims.

Allowable subject matter

Claim 9 has been rewritten as new claim 25 to incorporate all of the recitations of the base claim and any intervening claims in order to render it allowable. Applicant thanks Examiner for making the suggestion to rewrite this

claim to place it in an allowable condition. Applicant also thanks Examiner for allowing claims 19-21.

The Applicant has amended claim 22 to recite process steps involved in the ammonia absorption refrigeration process. This amendment should now overcome the 35 U.S.C. 112 rejections. Since Examiner stated that claims 22-24 would be allowable if rewritten or amended to overcome the 35 U.S.C. 112 rejection, the Applicant respectfully requests the Examiner to allow these claims.

Correspondence Address:
BP America Inc.
Docket Clerk, BP Legal, M.C. 5 East
4101 Winfield Road
Warrenville, Illinois 60555

Respectfully submitted,



Nirav Patel
Attorney for the Applicant
Registration Number 46,981
(630) 821-2439